

WHAT IS CLAIMED IS:

1. A drive circuit for use in a liquid crystal display,
said drive circuit supplying source signal from a
source driver to pixel electrodes through switching by
means of thin film transistors according to scan signals
from a gate driver,

 said drive circuit comprising adjusting means for
adjusting potential differences between the pixel
electrodes and a common electrode,

 wherein

 the adjusting means is composed of voltage level
altering means for shifting voltage levels of the source
signals supplied by the source driver equally for all the
pixel electrodes.

2. The drive circuit as defined in claim 1, wherein
 the adjusting means adjusts the potential
differences between the pixel electrodes and the common
electrode to compensate for effects of variations in
drain voltages caused by parasitic capacity in the thin
film transistors.

3. The drive circuit as defined in claim 1, wherein
when the pixel electrodes are made of a plurality of

kinds of metal film layers, the adjusting means adjusts the potential differences between the pixel electrodes and the common electrode to compensate for irregularities in DC voltage component between drains of the thin film transistors and one of the plurality of kinds of metal film layers that constitutes the pixel electrodes electrically connected to the drains and that is located closer to a liquid crystal layer than the other metal film(s).

4. The drive circuit as defined in claim 1, wherein the adjusting means adjusts the potential differences between the pixel electrodes and the common electrode to compensate for irregularities in DC voltage caused by asymmetry in properties between an active matrix substrate and an opposite substrate sandwiching a liquid crystal layer.

5. The drive circuit as defined in claim 1, wherein the voltage level altering means is provided in reference voltage generator means for producing source driver reference voltages from which the source driver produces the voltage levels of the source signals and is composed of: voltage divider means for producing and supplying the source driver reference voltages by voltage

division of a difference between high and low reference voltages; high-and-low-reference-voltage-interconnecting means for altering the high and low reference voltages in an interconnected manner; and low-reference-voltage-specifying means for specifying a ratio of the low reference voltage to the high reference voltage.

6. The drive circuit as defined in claim 1, wherein the voltage divider means is capable of producing a plurality of mutually different sets of voltages as the source drive reference voltages and selectively supplying one of the sets as outputs.

7. The drive circuit as defined in claim 5, wherein the high-and-low-reference-voltage-interconnecting means is composed of: an adder circuit including an OP-amplifier for adding two sets of produced voltages with each other to supply the high reference voltage as an output; and a subtractor circuit including an OP-amplifier for subtracting the two sets of produced voltages with each other to the low reference voltage as an output.

8. The drive circuit as defined in claim 5, wherein the high-and-low-reference-voltage-interconnecting

means is composed of a first inverter-amplifier circuit including an OP-amplifier for supplying as an output the low reference voltage from two sets of produced voltages and a second inverter-amplifier circuit including an OP-amplifier for supplying as an output the high reference voltage from the two sets of produced voltages.

9. The drive circuit as defined in claim 5, wherein the high-and-low-reference-voltage-interconnecting means is composed of: a low-reference-voltage-producing D/A conversion circuit for receiving DC level adjustment data and supplying the low reference voltage as an output; a digital adder circuit for adding the high-and-low-reference-voltage-level-difference-specifying data with the DC level adjustment data; and an high-reference-voltage-producing D/A conversion circuit for receiving the addition data supplied by the digital adder circuit and supplying the high reference voltage as an output.

10. The drive circuit as defined in claim 1, further comprising common electrode signal generator means including switching means only for switching between the ground potential and the positive power source to provide a fixed potential to the common electrode.

11. The drive circuit as defined in claim 10, wherein
the common electrode signal generator means is built
in the source driver.

12. A liquid crystal display, comprising a drive circuit
for use in a liquid crystal display,

said drive circuit supplying source signals from a
source driver to pixel electrodes through switching by
means of thin film transistors according to scan signals
from a gate driver,

said drive circuit including adjusting means for
adjusting potential differences between the pixel
electrodes and a common electrode,

wherein

the adjusting means is composed of voltage level
altering means for shifting voltage levels of the source
signals supplied by the source driver equally for all the
pixel electrodes.

13. The liquid crystal display as defined in claim 12,
wherein

the voltage level altering means is provided in
reference voltage generator means for producing source
driver reference voltages from which the source driver
produces the voltage levels of the source signals and is

composed of: voltage divider means for producing and supplying the source driver reference voltages by voltage division of a difference between high and low reference voltages; high-and-low-reference-voltage-interconnecting means for altering the high and low reference voltages in an interconnected manner; and low-reference-voltage-specifying means for specifying a ratio of the low reference voltage to the high reference voltage.

14. The liquid crystal display as defined in claim 13, wherein

the voltage divider means is capable of producing a plurality of mutually different sets of voltages as the source drive reference voltages and selectively supplying one of the sets as outputs.

15. The liquid crystal display as defined in claim 13, wherein

the high-and-low-reference-voltage-interconnecting means is composed of: an adder circuit including an OP-amplifier for adding two sets of produced voltages with each other to supply the high reference voltage as an output; and a subtractor circuit including an OP-amplifier for subtracting the two sets of produced voltages with each other to supply the low reference

voltage as an output.

16. The liquid crystal display as defined in claim 13,
wherein

the high-and-low-reference-voltage-interconnecting
means is composed of a first inverter-amplifier circuit
including an OP-amplifier for supplying as an output the
low reference voltage from two sets of produced voltages
and a second inverter-amplifier circuit including an OP-
amplifier for supplying as an output the high reference
voltage from the two sets of produced voltages.

17. The liquid crystal display as defined in claim 13,
wherein

the high-and-low-reference-voltage-interconnecting
means is composed of: a low-reference-voltage-producing
D/A conversion circuit for receiving DC level adjustment
data and supplying the low reference voltage as an
output; a digital adder circuit for adding the high-and-
low-reference-voltage-level-difference-specifying data
with the DC level adjustment data; and an high-reference-
voltage-producing D/A conversion circuit for receiving
the addition data supplied by the digital adder circuit
and supplying the high reference voltage as an output.

18. The liquid crystal display as defined in claim 12,
said drive circuit further including common
electrode signal generator means including switching
means only for switching between the ground potential and
the positive power source to provide a fixed potential to
the common electrode.

19. The liquid crystal display as defined in claim 18,
wherein

the common electrode signal generator means is built
in the source driver.

20. The liquid crystal display as defined in claim 12,
wherein

the liquid crystal display is one of reflective,
opaque, reflective/transparent, or transparent types.

21. Electronics, comprising a liquid crystal display
including a drive circuit for use in a liquid crystal
display,

said drive circuit supplying source signals from a
source driver to pixel electrodes through switching by
means of thin film transistors according to scan signals
from a gate driver,

said drive circuit including adjusting means for

adjusting potential differences between the pixel electrodes and a common electrode,

wherein

the adjusting means is composed of voltage level altering means for shifting levels of the voltage levels of the source signals supplied by the source driver equally for all the pixel electrodes.

22. The electronics as defined in claim 21, wherein the voltage level altering means is provided in reference voltage generator means for producing source driver reference voltages from which the source driver produces the voltage levels of the source signals and is composed of: voltage divider means for producing and supplying the source driver reference voltages by voltage division of a difference between high and low reference voltages; high-and-low-reference-voltage-interconnecting means for altering the high and low reference voltages in an interconnected manner; and low-reference-voltage-specifying means for specifying a ratio of the low reference voltage to the high reference voltage.

23. The electronics as defined in claim 22, wherein the voltage divider means is capable of producing a plurality of mutually different sets of voltages as the

source drive reference voltages and selectively supplying one of the sets as outputs.

24. The electronics as defined in claim 22, wherein the high-and-low-reference-voltage-interconnecting means is composed of: an adder circuit including an OP-amplifier for adding two sets of produced voltages with each other to supply the high reference voltage as an output; and a subtractor circuit including an OP-amplifier for subtracting the two sets of produced voltages with each other to supply the low reference voltage as an output.

25. The electronics as defined in claim 22, wherein the high-and-low-reference-voltage-interconnecting means is composed of a first inverter-amplifier circuit including an OP-amplifier for producing as an output the low reference voltage from two sets of produced voltages and a second inverter-amplifier circuit including an OP-amplifier for producing as an output the high reference voltage from the two sets of produced voltages.

26. The electronics as defined in claim 22, wherein the high-and-low-reference-voltage-interconnecting means is composed of: a low-reference-voltage-producing

D/A conversion circuit for receiving DC level adjustment data and supplying the low reference voltage as an output; a digital adder circuit for adding the high-and-low-reference-voltage-level-difference-specifying data with the DC level adjustment data; and an high-reference-voltage-producing D/A conversion circuit for receiving the addition data supplied by the digital adder circuit and supplying the high reference voltage as an output.

27. The electronics as defined in claim 21,
said driver circuit further including common electrode signal generator means including switching means only for switching between the ground potential and the positive power source to provide a fixed potential to the common electrode.
28. The drive circuit for use in a liquid crystal display as defined in claim 27, wherein
the common electrode signal generator means is built in the source driver.
29. The electronics as defined in claim 21, wherein
the liquid crystal display is one of reflective, opaque, reflective/transparent, or transparent types.

30. The electronics as defined in claim 21, wherein
the electronics include a mobile telephone, a
personal data assistant, a notebook personal computer, a
portable television set, and a portable game machine.